MSI
MICRO-STAR INTERNATIONAL

Fuzzy 945GM2/945GME2

MS-9642 (V1.X) Mainboard

G52-96421X2

Copyright Notice

The material in this document is the intellectual property of **MICRO-STAR INTERNATIONAL**. We take every care in the preparation of this document, but no guarantee is given as to the correctness of its contents. Our products are under continual improvement and we reserve the right to make changes without notice.

Trademarks

All trademarks are the properties of their respective owners.

Intel® and Pentium® are registered trademarks of Intel Corporation.
AMD, Athlon™, Athlon™ XP, Thoroughbred™, and Duron™ are registered trademarks of AMD Corporation.
NVIDIA, the NVIDIA logo, DualNet, and nForce are registered trademarks or trademarks of NVIDIA Corporation in the United States and/or other countries.
PS/2 and OS®/2 are registered trademarks of International Business Machines Corporation.
Windows® 95/98/2000/NT/XP are registered trademarks of Microsoft Corporation.
Netware® is a registered trademark of Novell, Inc.
Award® is a registered trademark of Phoenix Technologies Ltd.
AMI® is a registered trademark of American Megatrends Inc.

Revision History

Revision	Revision History	Date
V1.1	Updating CPU & chipset	November 2007

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance.

- Visit the MSI website at ***http://global.msi.com.tw/index.php?func=faqIndex*** for FAQ, technical guide, BIOS updates, driver updates, and other information.
- Contact our technical staff at ***http://support.msi.com.tw/***.

Safety Instructions

1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. DO NOT COVER THE OPENINGS.
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by service personnel:
    - ► The power cord or plug is damaged.
    - ► Liquid has penetrated into the equipment.
    - ► The equipment has been exposed to moisture.
    - ► The equipment does not work well or you can not get it work according to User's Manual.
    - ► The equipment has dropped and damaged.
    - ► The equipment has obvious sign of breakage.
12. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60°C (140°F), IT MAY DAMAGE THE EQUIPMENT.

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

警告使用者：

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此情況下，使用者會被要求採取某些適當的對策

廢電池請回收

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.

FCC-B Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the measures listed below.

- ► Reorient or relocate the receiving antenna.
- ► Increase the separation between the equipment and receiver.
- ► Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- ► Consult the dealer or an experienced radio/television technician for help.

Notice 1
The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2
Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

Micro-Star International
MS-9642

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

WEEE (Waste Electrical and Electronic Equipment) Statement

ENGLISH

To protect the global environment and as an environmentalist, MSI must remind you that...

Under the European Union ("EU") Directive on Waste Electrical and Electronic Equipment, Directive 2002/96/EC, which takes effect on August 13, 2005, products of "electrical and electronic equipment" cannot be discarded as municipal waste anymore and manufacturers of covered electronic equipment will be obligated to take back such products at the end of their useful life. MSI will comply with the product take back requirements at the end of life of MSI-branded products that are sold into the EU. You can return these products to local collection points.

DEUTSCH

Hinweis von MSI zur Erhaltung und Schutz unserer Umwelt

Gemäß der Richtlinie 2002/96/EG über Elektro- und Elektronik-Altgeräte dürfen Elektro- und Elektronik-Altgeräte nicht mehr als kommunale Abfälle entsorgt werden. MSI hat europaweit verschiedene Sammel- und Recyclingunternehmen beauftragt, die in die Europäische Union in Verkehr gebrachten Produkte, am Ende seines Lebenszyklus zurückzunehmen. Bitte entsorgen Sie dieses Produkt zum gegebenen Zeitpunkt ausschliesslich an einer lokalen Altgerätesammelstelle in Ihrer Nähe.

FRANÇAIS

En tant qu'écologiste et afin de protéger l'environnement, MSI tient à rappeler ceci...

Au sujet de la directive européenne (EU) relative aux déchets des équipement électriques et électroniques, directive 2002/96/EC, prenant effet le 13 août 2005, que les produits électriques et électroniques ne peuvent être déposés dans les décharges ou tout simplement mis à la poubelle. Les fabricants de ces équipements seront obligés de récupérer certains produits en fin de vie. MSI prendra en compte cette exigence relative au retour des produits en fin de vie au sein de la communauté européenne. Par conséquent vous pouvez retourner localement ces matériels dans les points de collecte.

РУССКИЙ

Компания MSI предпринимает активные действия по защите окружающей среды, поэтому напоминаем вам, что....

В соответствии с директивой Европейского Союза (ЕС) по предотвращению загрязнения окружающей среды использованным электрическим и электронным оборудованием (директива WEEE 2002/96/EC), вступающей в силу 13 августа 2005 года, изделия, относящиеся к электрическому и электронному оборудованию, не могут рассматриваться как бытовой мусор, поэтому производители вышеперечисленного электронного оборудования обязаны принимать его для переработки по окончании срока службы. MSI обязуется соблюдать требования по приему продукции, проданной под маркой MSI на территории ЕС, в переработку по окончании срока службы. Вы можете вернуть эти изделия в специализированные пункты приема.

ESPAÑOL

MSI como empresa comprometida con la protección del medio ambiente, recomienda:
Bajo la directiva 2002/96/EC de la Unión Europea en materia de desechos y/o equipos electrónicos, con fecha de rigor desde el 13 de agosto de 2005, los productos clasificados como "eléctricos y equipos electrónicos" no pueden ser depositados en los contenedores habituales de su municipio, los fabricantes de equipos electrónicos, están obligados a hacerse cargo de dichos productos al termino de su periodo de vida. MSI estará comprometido con los términos de recogida de sus productos vendidos en la Unión Europea al final de su periodo de vida. Usted debe depositar estos productos en el punto limpio establecido por el ayuntamiento de su localidad o entregar a una empresa autorizada para la recogida de estos residuos.

NEDERLANDS

Om het milieu te beschermen, wil MSI u graan herinneren dat….
De richtlijn van de Europese Unie (EU) met betrekking tot Vervuiling van Electrische en Electronische producten (2002/96/EC), die op 13 Augustus 2005 in zal gaan kunnen niet meer beschouwd worden als vervuiling.
Fabrikanten van dit soort producten worden verplicht om producten retour te nemen aan het eind van hun levenscyclus. MSI zal overeenkomstig de richtlijn handelen voor de producten die de merknaam MSI dragen en verkocht zijn in de EU. Deze goederen kunnen geretourneerd worden op lokale inzamelingspunten.

SRPSKI

Da bi zaštitili prirodnu sredinu, i kao preduzeće koje vodi računa o okolini i prirodnoj sredini, MSI mora da vas podseti da…
Po Direktivi Evropske unije ("EU") o odbačenoj elektronskoj i električnoj opremi, Direktiva 2002/96/EC, koja stupa na snagu od 13. Avgusta 2005, proizvodi koji spadaju pod "elektronsku i električnu opremu" ne mogu više biti odbačeni kao običan otpad i proizvođači ove opreme biće prinuđeni da uzmu natrag ove proizvode na kraju njihovog unbićajnog veka trajanja. MSI će poštovati zahtev o preuzimanju ovakvih proizvoda kojima je istekao vek trajanja, koji imaju MSI oznaku i koji su prodati u EU. Ove proizvode možete vratiti na lokalnim mestima za prikupljanje.

POLSKI

Aby chronić nasze środowisko naturalne oraz jako firma dbająca o ekologię, MSI przypomina, że...
Zgodnie z Dyrektywą Unii Europejskiej ("UE") dotyczącą odpadów produktów elektrycznych i elektronicznych (Dyrektywa 2002/96/EC), która wchodzi w życie 13 sierpnia 2005, tzw. "produkty oraz wyposażenie elektryczne i elektroniczne " nie mogą być traktowane jako śmieci komunalne, tak więc producenci tych produktów będą zobowiązani do odbierania ich w momencie gdy produkt jest wycofywany z użycia. MSI wypełni wymagania UE, przyjmując produkty (sprzedawane na terenie Unii Europejskiej) wycofywane z użycia. Produkty MSI będzie można zwracać w wyznaczonych punktach zbiorczych.

TÜRKÇE

Çevreci özelliğiyle bilinen MSI dünyada çevreyi korumak için hatırlatır:

Avrupa Birliği (AB) Kararnamesi Elektrik ve Elektronik Malzeme Atığı, 2002/96/EC Kararnamesi altında 13 Ağustos 2005 tarihinden itibaren geçerli olmak üzere, elektrikli ve elektronik malzemeler diğer atıklar gibi çöpe atılamayacak ve bu elektonik cihazların üreticileri, cihazların kullanım süreleri bittikten sonra ürünleri geri toplamakla yükümlü olacaktır. Avrupa Birliği'ne satılan MSI markalı ürünlerin kullanım süreleri bittiğinde MSI ürünlerin geri alınması isteği ile işbirliği içerisinde olacaktır. Ürünlerinizi yerel toplama noktalarına bırakabilirsiniz.

ČESKY

Záleží nám na ochraně životního prostředí - společnost MSI upozorňuje...

Podle směrnice Evropské unie ("EU") o likvidaci elektrických a elektronických výrobků 2002/96/EC platné od 13. srpna 2005 je zakázáno likvidovat "elektrické a elektronické výrobky" v běžném komunálním odpadu a výrobci elektronických výrobků, na které se tato směrnice vztahuje, budou povinni odebírat takové výrobky zpět po skončení jejich životnosti. Společnost MSI splní požadavky na odebírání výrobků značky MSI, prodávaných v zemích EU, po skončení jejich životnosti. Tyto výrobky můžete odevzdat v místních sběrnách.

MAGYAR

Annak érdekében, hogy környezetünket megvédjük, illetve környezetvédőként fellépve az MSI emlékezteti Önt, hogy ...

Az Európai Unió („EU") 2005. augusztus 13-án hatályba lépő, az elektromos és elektronikus berendezések hulladékairól szóló 2002/96/EK irányelve szerint az elektromos és elektronikus berendezések többé nem kezelhetőek lakossági hulladékként, és az ilyen elektronikus berendezések gyártói kötelessé válnak az ilyen termékek visszavételére azok hasznos élettartama végén. Az MSI betartja a termékvisszavétellel kapcsolatos követelményeket az MSI márkanév alatti az EU-n belül értékesített termékek esetében, azok élettartamának végén. Az ilyen termékeket a legközelebbi gyűjtőhelyre viheti.

ITALIANO

Per proteggere l'ambiente, MSI, da sempre amica della natura, ti ricorda che....

In base alla Direttiva dell'Unione Europea (EU) sullo Smaltimento dei Materiali Elettrici ed Elettronici, Direttiva 2002/96/EC in vigore dal 13 Agosto 2005, prodotti appartenenti alla categoria dei Materiali Elettrici ed Elettronici non possono più essere eliminati come rifiuti municipali: i produttori di detti materiali saranno obbligati a ritirare ogni prodotto alla fine del suo ciclo di vita. MSI si adeguerà a tale Direttiva ritirando tutti i prodotti marchiati MSI che sono stati venduti all'interno dell'Unione Europea alla fine del loro ciclo di vita. È possibile portare i prodotti nel più vicino punto di raccolta.

CONTENTS

Copyright Notice ii
Trademarks ii
Revision History ii
Technical Support ii
Safety Instructions iii
FCC-B Radio Frequency Interference Statement iv
WEEE (Waste Electrical and Electronic Equipment) Statement v
Chapter 1 Getting Started 1-1
Mainboard Specifications 1-2
Block Diagram 1-4
Mainboard Layout 1-5
Board Dimension 1-6
Back Panel & I/O Shield Drawing 1-7
Power Consumption 1-8
Safety Compliance & MTBF 1-9
Chapter 2 Hardware Setup 2-1
Quick Components Guide 2-2
CPU (Central Processing Unit) 2-3
Memory 2-6
Power Supply 2-7
Back Panel 2-8
Connectors 2-9
Jumpers 2-17
Slots 2-18
Chapter 3 BIOS Setup 3-1
Entering Setup 3-2
The Menu Bar 3-4
Main 3-5
Advanced 3-7
PCHealth 3-17
Security 3-19
System 3-20
Boot 3-21
Exit 3-22
Chapter 4 System Resources 4-1
Watch Dog Timer Setting 4-2
Award POST Code 4-4
Check Point & Beep Code List 4-10
Resource List 4-17

Chapter 1
Getting Started

Thank you for choosing the Fuzzy 945GM2/945GME2 (MS-9642 v1.X) Mini ITX mainboard from MSI.

Based on the innovative **Intel® 945GM/945GME** & **ICH7M** controllers for optimal system efficiency, the Fuzzy 945GM2/945GME2 accommodates the latest **Intel® Core 2 Duo/ Core Duo/ Core Solo/ Celeron M/ Celeron LV 423 BGA** (with BGA Passive Cooler) processors in Socket M and supports one 240-pin 533/ 667MHz DDR2 DIMM slot to provide the maximum of 2GB memory capacity.

In the entry-level and mid-range market segment, the Fuzzy 945GM2/945GME2 can provide a high-performance solution for today's front-end and general purpose workstation, as well as in the future.

MSI
MICRO-STAR INTERNATIONAL

Mainboard Specifications

Processor

- Intel® Core 2 Duo/Core Duo/Core Solo/Celeron M/Celeron LV 423 BGA (with BGA Passive Cooler) CPU in Socket M
- Supports 3 pin CPU Fan Pin-Header with Fan Speed Control
- Supports Intel Dual Core Technology to 533/667MHz and up

Intel® Core™ 2 Duo Processor T7400	Merom 667
Intel® Core™ 2 Duo Processor LV L7400	Merom 667
Intel® Core™ 2 Duo Processor ULV U7500	Merom 533
Intel® Core™ Duo Processor T2500	Yonah
Intel® Core™ Duo Processor Low Voltage L2400	Yonah
Intel® Core™ Duo Processor Ultra Low Voltage U2500	Yonah
Intel® Celeron® M Processor Ultra Low Voltage 423	Yonah

Chipset

- North Bridge: Intel® 945GM/ 945GME chipset
- South Bridge: Intel® ICH7M chipset

Memory

- DDR2 533/667 SDRAM (2GB Max)
- 1 DDR2 DIMM slot (240pin / 1.8V)

LAN

- Supports 3 PCI Express Gb Ethernet by Intel® 82573L or one Intel® 82562GZ 10/100 LAN (optional)

Audio

- HDA Codec by Realtek® ALC888 7.1 channel
- Compliant with Azalia 1.0 Spec.
- 6 watt amplifier (optional)

IDE

- 1 IDE port by ICH7M
- Supports Ultra DMA 66/100 mode
- Supports PIO, Bus Master operation mode

SATA

- SATA ports by ICH7M
- Supports two SATA devices
- Supports storage and data transfers at up to 150MB/s

Connectors

▶ **Back Panel**

- 3 RJ-45 LAN jacks
- 2 USB 2.0 ports
- 1 D-Sub VGA connector
- 1 serial port
- 1 PS2 keyboard/mouse port
- 1 Line-In/Line-Out/Mic-In stacked audio jack

▶ **Onboard Pinheaders**

- 1 USB 2.0 pinheader (2 ports)
- 1 parallel port pinheader
- 1 front audio pinheader
- 1 LVDS connector
- 1 Digital I/O pinheader (16GPIO)
- 1 RS232/422/485 header as COM2~COM5 (optional)
- 1 front panel pinheader

Slots

- 1 PCI Express x16 slot (supports MS-V004 ADD2 DVI Card)
- 1 PCI Express x 1 slot
- 1 PCI 32-bit/33MHz slot

Form Factor

- Mini ITX

Mounting

- 4 mounting holes

Environmental

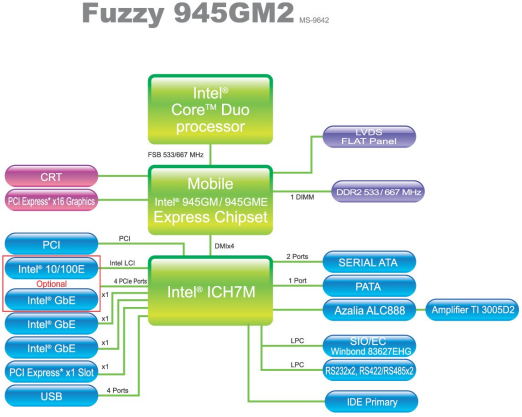
▶ **Storage Temperature**

- Temperature: -10°C ~ 70°C
- Humidity: 10% RH ~ 80% RH

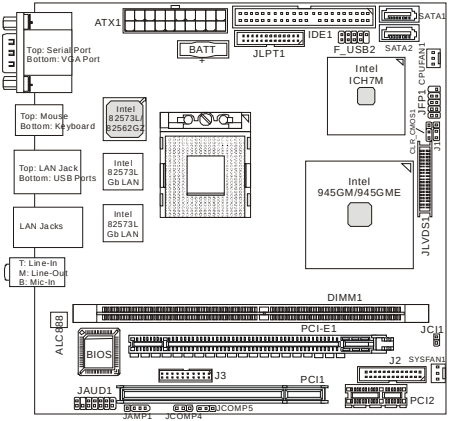
▶ **Operation Temperature**

- Temperature: 0°C ~ 60°C
- Humidity: 80% RH

Block Diagram

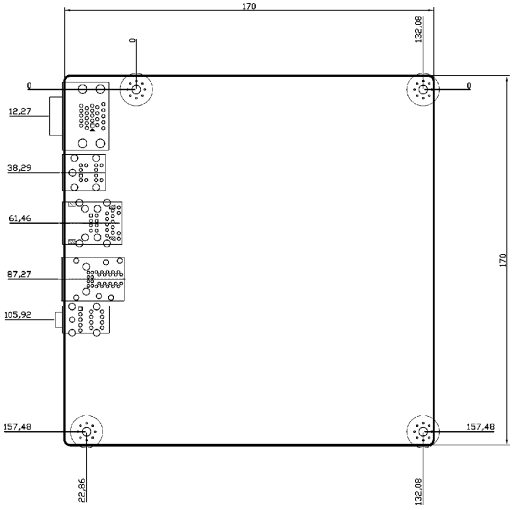


Mainboard Layout

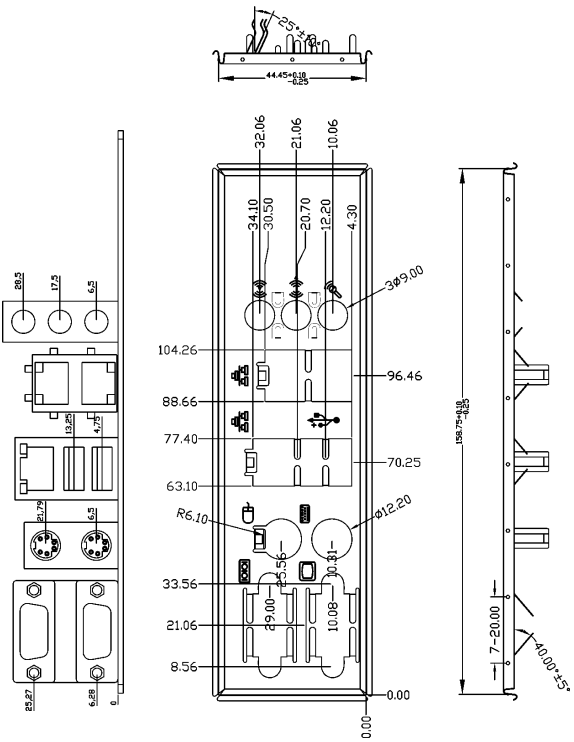


Fuzzy945GM2/945GME2
(MS-9642 v1.X) Mini ITX Mainboard

Board Dimension



Back Panel & I/O Shield Drawing



Power Consumption

Component	Description
Motherboard	MS-9642
CPU	Intel Core 2 T7200
Memory	DDR2 1GB
HDD	HITACHI 20G 1.8"
Operating system	Windows XP Professional SP2

	12V	5V	3.3V	-12V	5Vsb	Power (W)
3D Maker 2006	2.17	2.77	0.71	0.054	0.066	43.211
CPU Stress	2.35	2.32	0.68	0.035	0.066	42.794
Enter DOS	1.57	1.62	0.66	0.048	0.055	29.969
Enter BIOS	1.63	1.77	0.64	0.048	0.055	31.373
Idle Mode	0.65	1.63	0.69	0.056	0.05	19.149
S1	0.92	1.11	0.47	0.05	0.056	19.021
S3	0	0	0	0	0.33	1.65
S4	0	0	0	0	0.18	0.9
S5	0	0	0	0	0.19	0.95

Safety Compliance & MTBF

Certification	Standard number		Title of standard
CE	RFI	EN 55022:1998+A1:2000+A2:2003 Class B	Product family standard
		EN 6100-3-2:2000 Class D	Limits for harmonic current emission
		EN 6100-3-3:1995+A1:2001	Limitation of voltage fluctuation and flicker in low-voltage supply system
	Immunity	EN 55024:1998+A1:2001+A2:2003	Product family standard
BSMI	CNS 13438 乙類(1997年版)		
C-Tick	AS/NZS CISPR 22:2004		
FCC	FCC CFR Title 47 Part 15 Subpart B: 2005 Class B		
	CISPR 22: 2005		
VCCI	VCCI V-3:2004, Class B		
	VCCI V-4:2004, Class B		

MTBF - Reliability Prediction

Calculation Model	Operation Temperature(°C)	Operation Environment	Duty Cycle	MTBF(hr.)
Telcordia Issue 1	40	GB, GC - Ground Benign, Controlled	6,116.549285	163,491

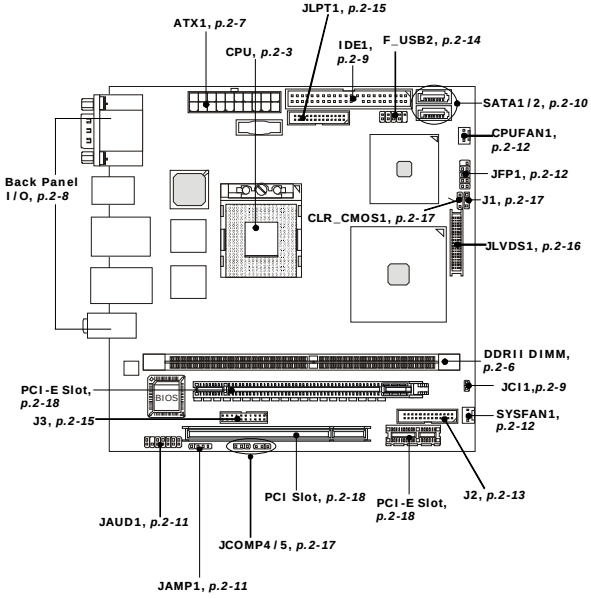
Chapter 2
Hardware Setup

This chapter provides you with the information about hardware setup procedures. While doing the installation, be careful in holding the components and follow the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

Use a grounded wrist strap before handling computer components. Static electricity may damage the components.

MSI
MICRO-STAR INTERNATIONAL

Quick Components Guide



CPU (Central Processing Unit)

The mainboard supports **Intel® Core 2 Duo/ Core Duo/ Core Solo/ Celeron M/ Celeron LV 423 BGA** (with BGA Passive Cooler) processors in Socket M. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

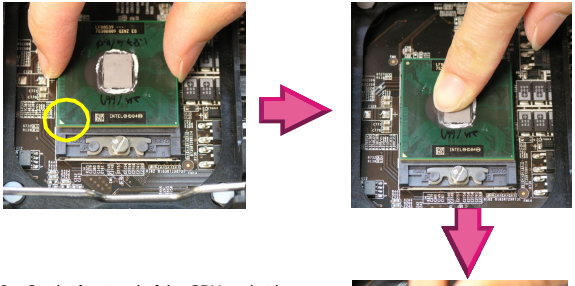
Intel® Core™ 2 Duo Processor T7400	Merom 667
Intel® Core™ 2 Duo Processor LV L7400	Merom 667
Intel® Core™ 2 Duo Processor ULV U7500	Merom 533
Intel® Core™ Duo Processor T2500	Yonah
Intel® Core™ Duo Processor Low Voltage L2400	Yonah
Intel® Core™ Duo Processor Ultra Low Voltage U2500	Yonah
Intel® Celeron® M Processor Ultra Low Voltage 423	Yonah

Important

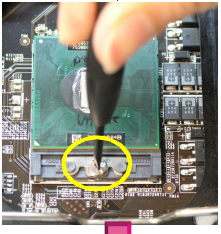
1. *Overheating will seriously damage the CPU and system. Always make sure the cooling fan can work properly to protect the CPU from overheating.*
2. *Make sure that you apply an even layer of heat sink paste (or thermal tape) between the CPU and the heatsink to enhance heat dissipation.*
3. *While replacing the CPU, always turn off the power supply or unplug the power supply's power cord from the grounded outlet first to ensure the safety of CPU.*

CPU & Cooler Set Installation

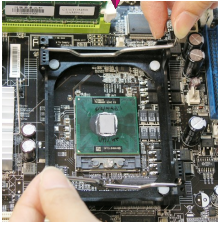
1. Place the CPU on top of the socket. Make sure to align the gold arrow on the CPU with the arrow key on the socket.
2. Push the CPU down until its pins securely fit into the socket.



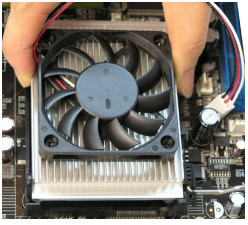
3. On the front end of the CPU socket is a locking mechanism designed into the form of a screw. Make sure that you actuate or deactuate this mechanism with a screwdriver before and after installing the CPU.



4. Release the metal clips on the retention mechanism.



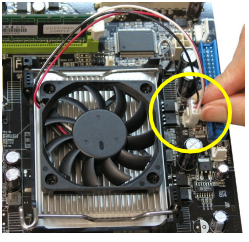
Mainboard photos shown in this section are for demonstration only and may differ from the actual look of your mainboard.



5. Mount the cooler set (fan & heatsink bundled) on top of the CPU and fit it into the retention mechanism.

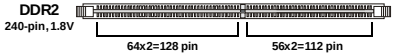
6. Secure the metal clips back to the retention mechanism.

7. Connect the fan power cable from the mounted fan to the 3-pin fan power connector on the mainboard.



Memory

The DIMM slots are intended for system memory modules.



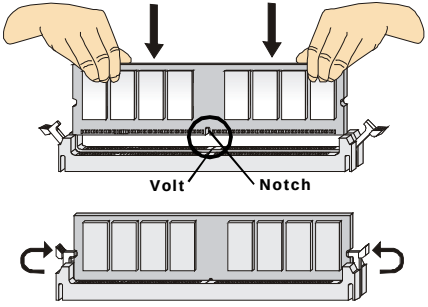
Installing Memory Modules

1. The memory module has only one notch on the center and will only fit in the right orientation.
2. Insert the memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the DIMM slot.

Important

You can barely see the golden finger if the memory module is properly inserted in the DIMM slot.

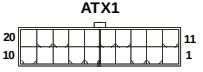
3. The plastic clip at each side of the DIMM slot will automatically close.



Power Supply

ATX 20-Pin System Power Connector: ATX1

This connector allows you to connect to an ATX power supply. To connect to the ATX power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.



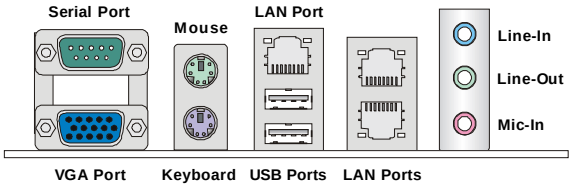
ATX1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

Important

*Power supply of **350watts** (and above) is highly recommended for system stability.*

Back Panel



▶ Serial Port Connector
The serial port is a 16550A high speed communications port that sends/ receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connector.

▶ VGA Connector
The DB15-pin female connector is provided for VGA monitors.

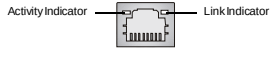
▶ Mouse/Keyboard Connector
The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

▶ USB Connectors
The OHCI (Open Host Controller Interface) Universal Serial Bus root is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices.

▶ Audio Port Connectors
These audio connectors are used for audio devices. You can differentiate the color of the audio jacks for different audio sound effects.

- **Blue audio jack** - Line In is used for external CD player, tapeplayer or other audio devices.
- **Green audio jack** - Line Out, is a connector for speakers or headphones.
- **Pink audio jack** - Mic In, is a connector for microphones.

▶ LAN (RJ-45) Jack
The standard RJ-45 jack is for connection to single Local Area Network (LAN). You can connect a network cable to it.



LED	Color	LED State	Condition
Left	Orange	Off	LAN link is not established.
		On (steady state)	LAN link is established.
		On (brighter & pulsing)	The computer is communicating with another computer on the LAN.
Right	Green	Off	10 Mbit/sec data rate is selected.
		On	100 Mbit/sec data rate is selected.
	Orange	On	1000 Mbit/sec data rate is selected.

Connectors

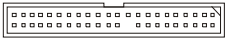
Chassis Intrusion Connector: JCI1

This connector connects to the chassis intrusion switch cable. If the chassis is opened, the chassis intrusion mechanism will be activated. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.

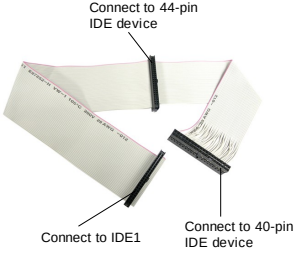
JCI1

44-Pin IDE Connector: IDE1

This 44-pin IDE connector connects to an optional converter that enables connection to one 44-pin IDE device and one 40-pin IDE device, such as hard disk drives, CD-ROM and other IDE devices.



IDE1

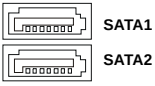


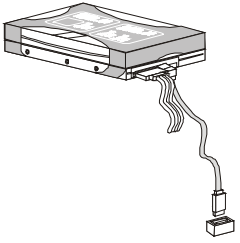
Important

If you install two IDE devices on the same cable, you must configure the drives separately to master / slave mode by setting jumpers. Refer to IDE device's documentation supplied by the vendors for jumper setting instructions.

Serial ATA Connectors: SATA1, SATA2

SATA1~SATA2 are high-speed SATA interface ports and support SATA data rates of 150MB/s. Each SATA connector can connect to 1 hard disk device and is fully compliant with Serial ATA 1.0 specifications.





Important

Please do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during transmission.

Audio Amplifier Connector: JAMP1

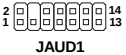
The JAMP1 is used to connect audio amplifiers to enhance audio performance.

Pin Definition

PIN	SIGNAL
1	AMP_L-
2	AMP_L+
3	AMP_R-
4	AMP_R+

Front Audio Connector: JAUD1

The JAUD1 connects to an optional audio bracket that provides extra front panel audio IO jacks.

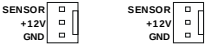


JAUD1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	5V_SB	2	VCC3
3	SPDF0	4	NA
5	GND	6	SPDF1
7	LEF_OUT	8	SURR_OUT_R
9	CEN_OUT	10	SURR_OUT_L
11	AUD_GPIO21	12	AUDIO GND
13	SIDE_L	14	SIDE_R

Fan Power Connectors: CPUFAN1, SYSFAN1

The fan power connectors support system cooling fan with +12V. When connecting the wire to the connectors, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.



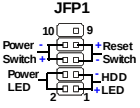
CPUFAN1 SYSFAN1

Important

Please refer to the recommended CPU fans at Intel® official website or consult the vendors for proper CPU cooling fan.

Front Panel Connector: JFP1

The mainboard provides one front panel connector for electrical connection to the front panel switches and LEDs. The JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.

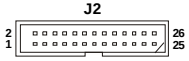


JFP1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	HD_LED +	Hard disk LED pull-up
2	FPPWR/SLP	MSG LED pull-up
3	HD_LED -	Hard disk active LED
4	FPPWR/SLP	MSG LED pull-up
5	RST_SW-	Reset Switch low reference pull-down to GND
6	PWR_SW +	Power Switch high reference pull-up
7	RST_SW+	Reset Switch high reference pull-up
8	PWR_SW -	Power Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.

Serial Port Connector: J2

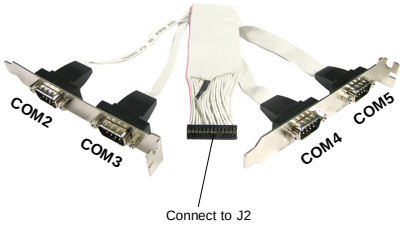
The J2 is a RS232/422/485 COM port pinheader that connects to serial devices.



	RS232	RS422	RS485
COM2	X	V	V
COM3	X	V	V
COM4	V	X	X
COM5	V	X	X

V = supported **X** = not supported

Serial Port Bracket
(Optional)



J2 Pin Definition

Voltage Select	Serial Port	PIN	SIGNAL	PIN	SIGNAL	Serial Port	Voltage Select
N/A	COM2	1	422 RXD1#	2	422 RXD2#	COM3	N/A
		3	422 RXD1	4	422 RXD2		
		5	422 TXD1	6	422 TXD2		
		7	422 TXD1#	8	422 TXD2#		
		9	GND	10	GND		
JCOMP4 (page 2-17)	COM4	11	NDCD3#	12	NDCD4#	COM5	JCOMP5 (page 2-17)
		13	NSIN3	14	NSIN4		
		15	NSOUT3	16	NSOUT4		
		17	NDTR3	18	NDTR4		
		19	NDSR3#	20	NDSR4#		
		21	NRTS3	22	NRTS4		
		23	NCTS3#	24	NCTS4#		
		25	0V/5V/12V	26	0V/5V/12V		

Front USB Connector: F_USB2

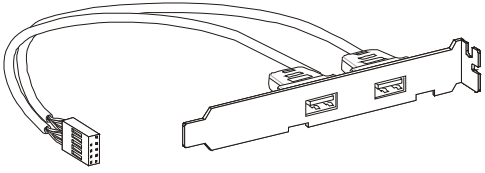
The mainboard provides one USB 2.0 pinheader (optional USB 2.0 bracket available) that is compliant with Intel® I/O Connectivity Design Guide. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems and the like**.

F_USB2

Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key (no pin)	10	USBOC

USB 2.0 Bracket
(Optional)



Important

Note that the pins of VCC and GND must be connected correctly to avoid possible damage.

Digital IO Connector: J3

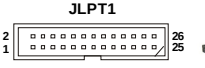
The J3 connects to the General-Purpose Input/Output (GPIO) peripheral module.

J3 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	VCC3	2	VCC5
3	N_GPIO10	4	N_GPIO20
5	N_GPIO11	6	N_GPIO21
7	N_GPIO12	8	N_GPIO22
9	N_GPIO13	10	N_GPIO23
11	N_GPIO14	12	N_GPIO24
13	N_GPIO15	14	N_GPIO25
15	N_GPIO16	16	N_GPIO26
17	N_GPIO17	18	N_GPIO27
19	GND	20	NC

Parallel Port Header: JLPT1

The mainboard provides a 26-pin header for connection to an optional parallel port bracket. The parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.

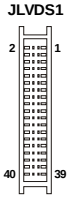


Parallel Port Bracket (Optional)

Pin	Signal Name	Pin	Signal Name
1	RSTB#	2	AFD#
3	PRND0	4	ERR#
5	PRND1	6	PINIT#
7	PRND2	8	LPT_SLIN#
9	PRND3	10	GND
11	PRND4	12	GND
13	PRND5	14	GND
15	PRND6	16	GND
17	PRND7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	GND

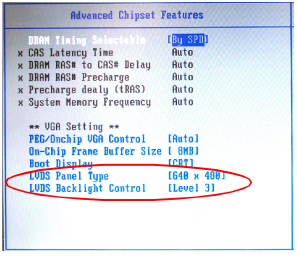
LVDS Flat Panel Connector: JLVDS1

The LVDS (Low Voltage Differential Signal) connector provides a digital interface typically used with flat panels. After connecting an LVDS interfaced flat panel to the JLVDS1, be sure to check the panel datasheet and set the J1 LVDS Power Selection Jumper to a proper voltage.



SIGNAL	PIN		SIGNAL
+12V	2	1	+12V
+12V	4	3	+12V
GND	6	5	+12V
GND	8	7	+3V
LCDVCC	10	9	LCDVCC
DDC DATA	12	11	DDC CLK
VDD ENABLE	14	13	BKLTCTL
GND	16	15	BKLTEN
LVDS A0+	18	17	LVDS A0-
LVDS A1+	20	19	LVDS A1-
LVDS A2+	22	21	LVDS A2-
LVDS ACLK+	24	23	LVDS ACLK-
NC	26	25	NC
GND	28	27	GND
LVDS B0+	30	29	LVDS B0-
LVDS B1+	32	31	LVDS B1-
LVDS B2+	34	33	LVDS B2-
LVDS BCLK+	36	35	LVDS BCLK-
NC	38	37	NC
GND	40	39	GND

After hardware installation is done, select the LVDS panel type and tune the LVDS backlight in the BIOS Setup Utility.



Jumpers

LVDS Power Selection Jumper: J1

Use this jumper to specify the LVDS power.

J1

Pin	Signal Name
1	VCC3
2	LCD_SRC (default VCC3)
3	VCC5

COM Port Power Jumpers: JCOMP4, JCOMP5

These jumpers specify the operation voltage of the serial port COM4 & COM5.

JCOMP4

+5V +12V

JCOMP5

+5V +12V

Clear CMOS Jumper: CLR_CMOS1

There is a CMOS RAM onboard that has a power supply from external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set the CLR_CMOS1 (Clear CMOS Jumper) to clear data.

CLR_CMOS1

Clear Data

Keep Data

Important

You can clear CMOS by shorting 1-2 pin while the system is off. Then return to 2-3 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

Slots

PCI (Peripheral Component Interconnect) Express Slot

PCI Express architecture provides a high performance I/O infrastructure for Desktop Platforms with transfer rates starting at 2.5 Giga transfers per second over a PCI Express x1 lane for Gigabit Ethernet, TV Tuners, 1394 controllers, and general purpose I/O. Also, desktop platforms with PCI Express Architecture will be designed to deliver highest performance in video, graphics, multimedia and other sophisticated applications. Moreover, PCI Express architecture provides a high performance graphics infrastructure for Desktop Platforms doubling the capability of existing AGP 8x designs with transfer rates of 4.0 GB/s over a PCI Express x16 lane for graphics controllers, while PCI Express x1 supports transfer rate of 250 MB/s.

PCI Express x16 Slot

PCI Express x1 Slot

PCI (Peripheral Component Interconnect) Slot

The PCI slot supports LAN cards, SCSI cards, USB cards, and other add-on cards that comply with PCI specifications. At 32 bits and 33 MHz, it yields a throughput rate of 133 MBps.

32-bit PCI Slot

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus pins as follows:

	Order 1	Order 2	Order 3	Order 4
32-bit PCI1	INT A#	INT B#	INT C#	INT D#

Important

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

Chapter 3
BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.
You may need to run the Setup program when:

- An error message appears on the screen during the system booting up, and requests you to run SETUP.
- You want to change the default settings for customized features.

MSI
MICRO-STAR INTERNATIONAL

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <F1> key to enter Setup.

Press F1 to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Important

1. *The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.*
2. *Upon boot-up, the 1st line appearing after the memory count is the BIOS version. It is usually in the format:*

   P9642IMS V1.0 111507 where:

   1st digit refers to BIOS maker as A = AMI, W = AWARD, and P = PHOENIX.
   2nd - 5th digit refers to the model number.
   6th digit refers to the chipset as I = Intel, N = nVidia, and V = VIA.
   7th - 8th digit refers to the customer as MS = all standard customers.
   V1.0 refers to the BIOS version.
   111507 refers to the date this BIOS was released.

Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F6>	Load Optimized Defaults
<F7>	Load Fail-Safe Defaults
<F10>	Save all the CMOS changes and exit

Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

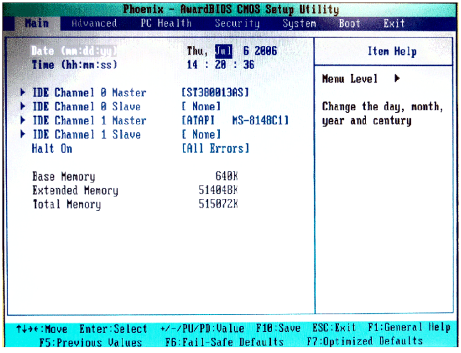
Sub-Menu

If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc >.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

The Menu Bar



▶ Main
Use this menu for basic system configurations, such as time, date etc.

▶ Advanced
Use this menu to set up the items of special enhanced features available on your system's chipset.

▶ PC Health
This entry monitors your hardware health status.

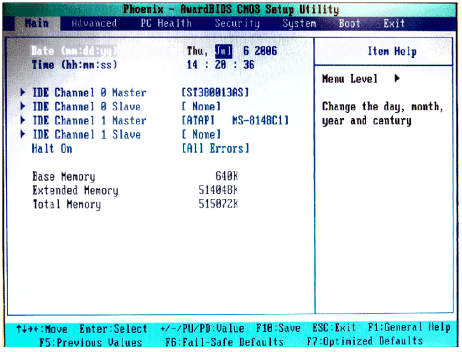
▶ Security
Use this menu to set Supervisor and User Passwords.

▶ System
This entry shows your system summary.

▶ Boot
Use this menu to specify the priority of boot devices.

▶ Exit
This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

Main



▶ Date (mm:dd:yy)
The date format is <Day>, <Month> <Date> <Year>.

▶ Time (hh:mm:ss)
The time format is <Hour> <Minute> <Second>.

▶ IDE Channel 0/1 Master/Slave
Press PgUp/<+> or PgDn/<-> to select [Manual], [None] or [Auto] type. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use [Manual] to define your own drive type manually.

If you select [Manual], related information is asked to be entered to the following items. Enter the information directly from the keyboard. This information should be provided in the documentation from your hard disk vendor or the system manufacturer.

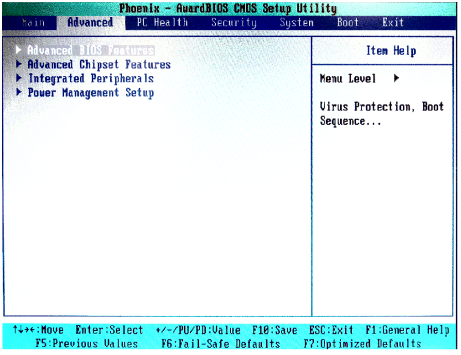
Access Mode	The settings are CHS, LBA, Large, Auto.
Capacity	The formatted size of the storage device.
Cylinder	Number of cylinders.
Head	Number of heads.
Precomp	Write precompensation.
Landing Zone	Cylinder location of the landing zone.
Sector	Number of sectors.

▶ Halt On
The setting determines whether the system will stop if an error is detected at boot. When the system stops for the errors preset, it will halt on for 15 seconds and then automatically resume its operation. Available options are:

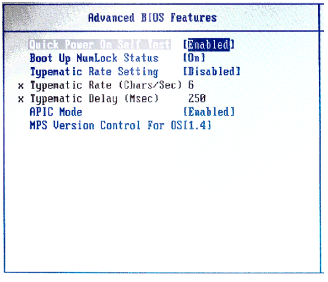
[All Errors]	The system stops when any error is detected.
[No Errors]	The system doesn't stop for any detected error.
[All, But Keyboard]	The system doesn't stop for a keyboard error.

▶ Base/Extended/Total Memory
The three items show the memory status of the system. (Read-only)

Advanced



► Advanced BIOS Features
The sub-menu is used to configure chipset features for optimal system performance.



► Quick Power On Self Test
Select [Enabled] to reduce the amount of time required to run the power-on self-

test (POST). A quick POST skips certain steps. We recommend that you normally disable quick POST. Better to find a problem during POST than lose data during your work.

▶ Boot Up NumLock Status
This setting is to set the Num Lock status when the system is powered on. Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

▶ Typematic Rate Setting
This item is used to enable or disable the typematic rate setting including Typematic Rate & Typematic Delay.

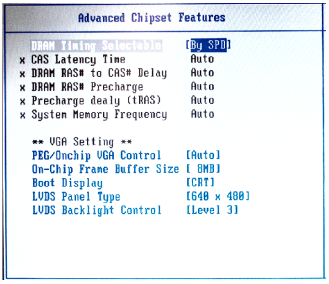
▶ Typematic Rate (Chars/Sec)
After Typematic Rate Setting is enabled, this item allows you to set the rate (characters/second) at which the keys are accelerated.

▶ Typematic Delay (Msec)
This item allows you to select the delay between when the key was first pressed and when the acceleration begins.

▶ APIC Mode
This field is used to enable or disable the APIC (Advanced Programmable Interrupt Controller). Due to compliance with PC2001 design guide, the system is able to run in APIC mode. Enabling APIC mode will expand available IRQ resources for the system.

▶ MPS Version Control For OS
This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system.

▶ Advanced Chipset Features
The sub-menu is used to configure chipset features for optimal system performance.



▶ DRAM Timing Selectable
Selects whether DRAM timing is controlled by the SPD (Serial Presence Detect) EEPROM on the DRAM module. Setting to [By SPD] enables DRAM timing to be determined automatically by BIOS based on the configurations on the SPD. Selecting [Manual] allows users to configure the following fields manually.

▶ CAS Latency Time
This controls the timing delay (in clock cycles) before SDRAM starts a read command after receiving it. Smaller clocks increase system performance while bigger clocks provide more stable system performance.

▶ DRAM RAS# to CAS# Delay
This field allows you to set the number of cycles for a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from or refreshed. Fast speed offers faster performance while slow speed offers more stable performance.

▶ DRAM RAS# Precharge
This item controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If insufficient time is allowed for the RAS to accumulate its charge before DRAM refresh, refresh may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system.

▶ Precharge Delay (tRAS)
The field specifies the idle cycles before precharging an idle bank.

▶ System Memory Frequency
Use this item to configure the clock frequency of the installed DRAMs.

****VGA Setting****
The following items allow you to configure the VGA settings of the system.

▶ PEG/Onchip VGA Control
This setting allows you to select whether to use the onchip graphics processor or the PCI Express card.
When set to [Onchip VGA], the motherboard boots up using the onboard graphics processor, even when a PCI Express graphics card is installed.
When set to [PEG Port], the motherboard boots up using the PCI Express graphics card, if one is installed. Otherwise, it defaults to the onboard graphics processor.
When set to [Auto], the BIOS checks to see if a PCI Express graphics card is installed. If it detects that a PCI Express graphics card is present, the motherboard boots up using that card. Otherwise, it defaults to the onboard graphics processor.

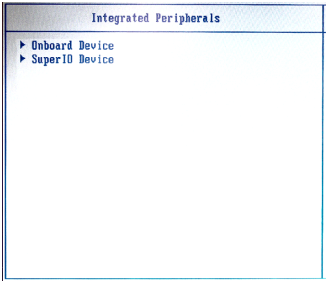
▶ On-Chip Frame Buffer Size
The field specifies the size of system memory allocated for video memory.

▶ Boot Display
Use the field to select the type of device you want to use as the display(s) of the system.

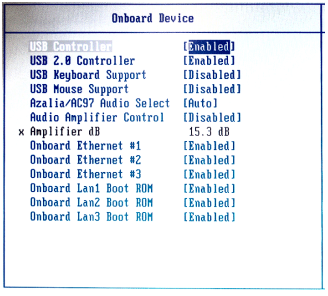
▶ LVDS Panel Type
This setting specifies the resolution of the LVDS panel.

▶ LVDS Backlight Control
This setting controls the brightness level of the LVDS panel backlight.

▶ Integrated Peripherals



▶ Onboard Device



▶ USB Controller
This setting is used to enable/disable the onboard USB controller.

▶ USB 2.0 Controller
This setting is used to enable/disable the onboard USB 2.0 controller.

▶ USB Keyboard/Mouse Support
Set to [Enabled] if your need to use a USB-interfaced keyboard/mouse in the

operating system that does not support or have any USB driver installed, such as DOS and SCO Unix.

► Azalia/AC97 Audio Select
Azalia is the codename of "High Definition Audio." This setting controls the High Definition Audio interface integrated in the Southbridge.

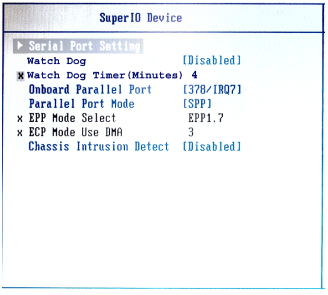
► Audio Amplifier Control
This setting disables/enables the audio amplifier.

► Amplifier dB
When the ***Audio Amplifier Control*** is set to [Enabled], users may adjust the amplifier dB range between the lowest useful output and the largest useful output level.

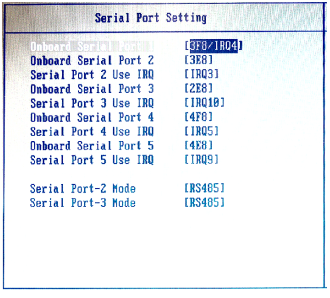
► Onboard Ethernet #1/ #2/ #3
These settings disable/enable the onboard Ethernet controller.

► Onboard LAN1/ LAN2/ LAN3 Boot ROM
The items enable or disable the initialization of the onboard LAN Boot ROMs during bootup. Selecting [Disabled] will speed up the boot process.

▶ Super IO Device



▶ Serial Port Setting



▶ Onboard Serial Port 1 / 2 / 3 / 4 / 5
Select an address for Serial Port 1/2/3/4/5.

▶ Serial Port 1 / 2 / 3 / 4 / 5 Use IRQ
Select a corresponding interrupt for Serial Port 1/2/3/4/5.

▶ Serial Port 2 / 3 Mode
These settings specify the transmission mode of the Serial Port 2 & 3.
RS-422 defines a Balanced (differential) interface, specifying a single, unidirectional driver with multiple receivers (up to 32). RS-422 will support Point-to-Point, Multi-Drop circuits, but not Multi-Point.
RS-485 defines a Balanced (differential) interface, specifying bidirectional, half-duplex data transmission. Up to 32 transmitters and 32 receivers may be interconnected in any combination, including one driver and multiple receivers (multi-drop), or one receiver and multiple drivers.

▶ Watch Dog
You can enable the system watch-dog timer, a hardware timer that generates either an NMI or a reset when the software that it monitors does not respond as expected each time the watch dog polls it.

▶ Watch Dog Timer (Minutes)
Select the watch-dog timer period.

▶ Onboard Parallel Port
There is a built-in parallel port on the on-board Super I/O chipset that provides Standard, ECP, and EPP features. It has the following options:

[Disabled]	
[3BC/IRQ7]	Line Printer port 0
[278/IRQ5]	Line Printer port 2
[378/IRQ7]	Line Printer port 1

▶ Parallel Port Mode

[SPP]	Standard Parallel Port
[EPP]	Enhanced Parallel Port
[ECP]	Extended Capability Port
[ECP+EPP]	Extended Capability Port + Enhanced Parallel Port

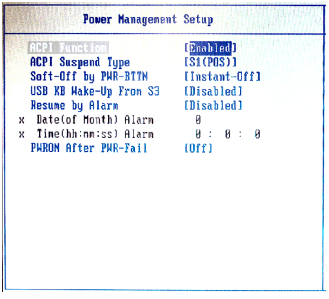
To operate the onboard parallel port as Standard Parallel Port only, choose [SPP]. To operate the onboard parallel port in the EPP mode simultaneously, choose [EPP]. By choosing [ECP], the onboard parallel port will operate in ECP mode only. Choosing [ECP + EPP] will allow the onboard parallel port to support both the ECP and EPP modes simultaneously.

▶ EPP Mode Select
The onboard parallel port is EPP Spec. compliant, so after the user chooses the onboard parallel port with the EPP function, the following message will be displayed on the screen: “EPP Mode Select.” At this time either [EPP 1.7] spec or [EPP 1.9] spec can be chosen.

▶ ECP Mode Use DMA
The ECP mode has to use the DMA channel, so choose the onboard parallel port with the ECP feature. After selecting it, the following message will appear: “ECP Mode Use DMA.” At this time, the user can choose between DMA channel [3] or [1].

▶ Chassis Intrusion Detect
The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened. To clear the warning message, set the field to [Reset]. The setting of the field will automatically return to [Enabled] later.

▶ Power Management Setup



▶ ACPI Function
This item is to activate the ACPI (Advanced Configuration and Power Management Interface) Function. If your operating system is ACPI-aware, such as Windows 98SE/2000/ME, select [Enabled].

▶ ACPI Suspend Type
This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME and Windows 2000, you can choose to enter the Standby mode in S1 (POS) or S3 (STR) fashion through the setting of this field. Options are:

[S1(POS)] The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.

[S3(STR)] The S3 sleep mode is a lower power state where the information of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a “wake up” event occurs.

▶ Soft-Off by PWR-BTTN
This feature allows users to configure the power button function. Settings are:

[Instant-Off]	The power button functions as a normal power-on/-off button.
[Delay 4 Sec.]	When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

▶ USB KB Wake-Up from S3
This setting allows you to enter "Any Key" (max. 8 numbers) to wake up the system from S3 state.

▶ Resume By Alarm
When [Enabled], your can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode.

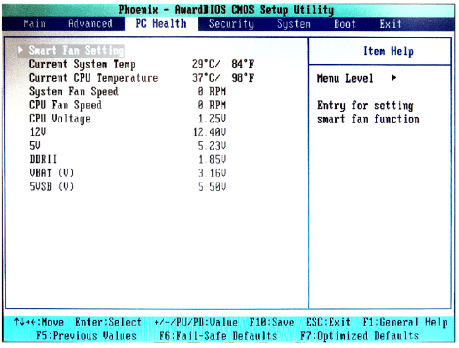
▶ Date (of Month) Alarm
When ***Resume By Alarm*** is set to [Enabled], the field specifies the month for ***Resume By Alarm***.

▶ Time (hh:mm:ss) Alarm
You can choose what hour, minute and second the system will boot up.

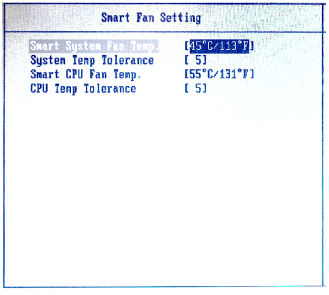
▶ PWRON After PWR-Fail
This item specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

[Off]	Leaves the computer in the power off state.
[On]	Leaves the computer in the power on state.
[Former-sts]	Restores the system to the status before power failure or interrupt occurred.

PC Health



► Smart Fan Setting



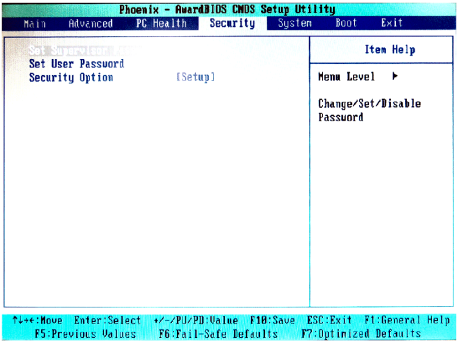
► Smart System / CPU Fan Temp.
Select a temperature setting here, and if the temperature of the CPU/system climbs up to the selected temperature setting, the system will automatically

increase the speed of the CPU/system fan to cool down the overheated CPU/system.

▶ **System / CPU Temp Tolerance**
You can select a fan tolerance value here for the specific range for the ***Smart System / CPU Fan Temp.*** items. If the current temperatures of the fans reach the maximum threshold (the temperatures set in the ***Smart System / CPU Fan Temp.*** plus the tolerance values you set here), the fans will speed up for cooling down. On the contrary if the current temperatures reach the minimum threshold (the set temperatures minus the tolerance values), the fans will slow down to keep the temperatures stable.

▶ **Current System Temp, Current CPU Temperature, System Fan Speed, CPU Fan Speed, CPU Voltage, 12V, 5V, DDRII, VBAT (V), 5VSB (V)**
These items display the current status of all of the monitored hardware devices/components such as CPU voltage, temperatures and all fans' speeds.

Security



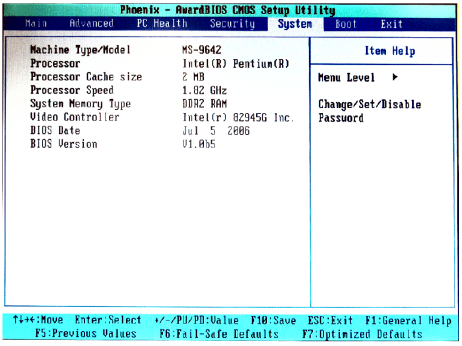
▶ Set Supervisor Password
Supervisor Password controls access to the BIOS Setup utility.

▶ Set User Password
User Password controls access to the system at boot.

▶ Security Option
This specifies the type of BIOS password protection that is implemented. Settings are described below:

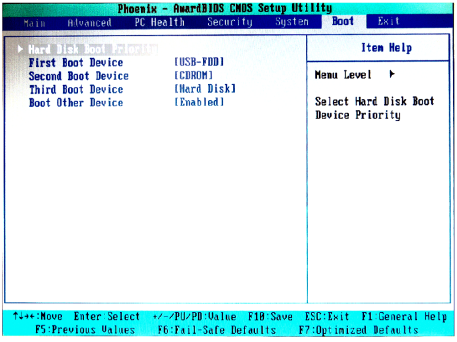
Option	Description
[Setup]	The password prompt appears only when end users try to run Setup.
[System]	A password prompt appears every time when the computer is powered on or when end users try to run Setup.

System



► Machine Type/Model, Processor, Processor Cache Size, Processor Speed, System Memory Type, Video Controller, BIOS Date, BIOS Version
These items show the hardware specifications of your system. Read only.

Boot

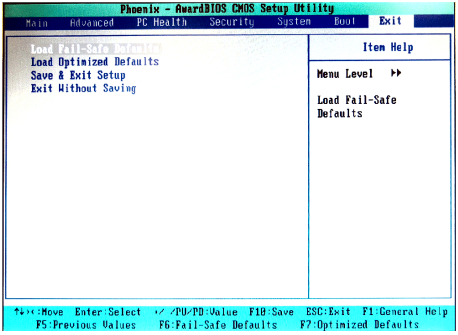


▶ Hard Disk Boot Priority
This setting allows users to set the boot priority of the specified hard disk devices. First press <Enter> to enter the sub-menu. Then you may use the arrow keys (↑↓) to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

▶ First / Second / Third Boot Device
The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system.

▶ Boot Other Device
Setting the option to [Enabled] allows the system to try to boot from other device if the system fails to boot from the first/second/third boot device.

Exit



▶ Load Fail-Safe Defaults
Use this menu to load the default values set by the BIOS vendor for stable system performance.

▶ Load Optimized Defaults
Use this menu to load the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard.

▶ Save & Exit Setup
Save changes to CMOS and exit setup.

▶ Exit Without Saving
Abandon all changes and exit setup.

Chapter 4
System Resources

This chapter provides information on the following system resources:

1. Watch Dog Timer Setting (p.4-2);

2. Award POST Code (p.4-4);

3. Check Point & Beep Code List (p.4-10);

4. Resource List (p.4-17).

MSI
MICRO-STAR INTERNATIONAL

Watch Dog Timer Setting

```
ifdef   Superio_Support_Watch_Dog

                extrn  Watch_Dog_Item:near
                extrn  WD_Timer_Item:near
                mov   si,offset MENUITEMGROUP:Watch_Dog_Item
                call   F000_GetItem_Value
                test   al, Watch_Dog_Cmos_bits
                jz      @F              ;jump if disable

                mov   dx, 04Eh     ;Enter config
                mov   al, 087h
                out     dx,al
                NEWIODELAY
                out     dx,al
                NEWIODELAY

                mov   al,07h                    ;Logical Device 8
                mov   dx, 04Eh
                out     dx,al
                NEWIODELAY
                 mov   ax,08h
                inc     dx
                out     dx,al
                NEWIODELAY

                mov   al, 2Dh
                mov   dx, 04Eh
                out     dx,al
                NEWIODELAY

                inc     dx
                in      al, dx
                and   al, 0FEh
                out     dx,al
                NEWIODELAY

                mov   al, 0F5h     ;For By Pass
                mov   dx, 04Eh
                out     dx,al
                NEWIODELAY

                mov   al,08h
                inc     dx
                out     dx,al
                NEWIODELAY
```

```
WD_reboot:
                mov   si,offset MENUITEMGROUP:WD_Timer_Item
                call    F000_GetItem_Value
                mov   ah, al


                mov   al,0F6h                ;Set time
                mov   dx, 04Eh
                out     dx,al
                NEWIODELAY

                mov   al, ah          ;fill time 9641_046
                inc     dx
                out     dx,al
                NEWIODELAY

                mov   dx, 04Eh      ;Exit config
                 mov    al, 0AAh
                out     dx, al
                NEWIODELAY

@@:
endif  ;Superio_Support_Watch_Dog
```

Award POST Code

Award BIOS Error Message and Check Point (POST code) List (Need to be modified, TBD)

- **Error/Process Message.**

#	Short Name	Description	Possible FRUS
1	CMOS checksum error - Defaults loaded	Checksum of CMOS is incorrect, so the system loads the default equipment configuration. A checksum error may indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.	System board
2	CPU at nnnn	Displays the running speed of the CPU.	processor
3 4	Press ESC to skip memory test Floppy disk(s) fail	The user may press Esc to skip the full memory test. Cannot find or initialize the floppy drive controller or the drive. Make sure the controller is installed correctly. If no floppy drives are installed, be sure the Diskette Drive selection in Setup is set to NONE or AUTO.	System board system board
5	HARD DISK initializing Please wait a moment	Some hard drives require extra time to initialize.	System board
6	HARD DISK INSTALL FAILURE	Cannot find or initialize the hard drive controller or the drive. Make sure the controller is installed correctly. If no hard drives are installed, be sure the Hard Drive selection in Setup is set to NONE.	System board
7	Keyboard error or no keyboard present	Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are pressed during POST. To purposely configure the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. The BIOS then ignores the missing keyboard during POST.	System board
8	Memory Test:	This message displays during a full memory test, counting down the memory areas being tested.	DIMM System board

- **Check Point List**

POST (hex)	Description
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
A1h	Set Initial Conditions (Default Values) in EBP
A2h	Determine FSB frequency.
A3h	Begin Detection of installed DIMMS
A4h	Check for Column Latency
A5h	200Mhz or 266Mhz
A6h	Check for tRAS timing
A7h	Check for tRP timing
A8h	Check for tRCD timing
A9h	Check for ECC Support
AAh	Check for refresh timing
ABh	Verify that the DIMM's are in matched pairs
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
01h	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	1. Disable PS/2 mouse interface (optional). 2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved

10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. 3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information. 4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. 5. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address. 2. Initialize the APIC for Pentium class CPU. 3. Program early chipset according to CMOS setup. Example: onboard IDE controller. 4. Measure CPU speed. 5. Invoke video BIOS.

2Ah	Reserved
2Bh	Reserved
2Ch	Reserved
2Dh	1. Initialize multi-language 2. Put information on screen display, including Award title, CPU type, CPU speed .....
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34h	Reserved
35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45h	Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page. 2. Program write allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved

50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onbaord_AUDIO switch.
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reserved
64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to “AUTO”.
6Eh	Reserved
6Fh	1.Initialize floppy controller 2.Set up floppy related fields in 40:hardware.
70h	Reserved
71h	Reserved
72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..

76h	Reserved
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved
7Fh	1. Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: wClear EPA or customization logo.
80h	Reserved
81h	Reserved
82h	1. Call chipset power management hook. 2. Recover the text fond used by EPA logo (not for full screen logo) 3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs.
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining
95h	1. Program daylight saving 2. Update keyboard LED & typematic rate
96h	1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)

Check Point & Beep Code List

Bootblock Initialization Code Checkpoints

Checkpoint	Description
Before D0	If boot block debugger is enabled, CPU cache-as-RAM functionality is enabled at this point. Stack will be enabled from this point.
D0	Early Boot Strap Processor (BSP) initialization like microcode update, frequency and other CPU critical initialization. Early chipset initialization is done.
D1	Early super I/O initialization is done including RTC and keyboard controller. Serial port is enabled at this point if needed for debugging. NMI is disabled. Perform keyboard controller BAT test. Save power-on CPUID value in scratch CMOS. Go to flat mode with 4GB limit and GA20 enabled.
D2	Verify the boot block checksum. System will hang here if checksum is bad.
D3 D4	Disable CACHE before memory detection. Execute full memory sizing module. If memory sizing module not executed, start memory refresh and do memory sizing in Boot block code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled. Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM. Copies compressed boot block code to memory in right segments. Copies BIOS from ROM to RAM for faster access. Performs main BIOS checksum and updates recovery status accordingly.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. If BIOS recovery is necessary, control flows to checkpoint E0. See *Bootblock Recovery Code Checkpoints* section of document for more information.
D7	Restore CPUID value back into register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determine whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9 DA	Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM. Restore CPUID value back into register. Give control to BIOS POST (ExecutePOSTKernel). See *POST Code Checkpoints* section of document for more information.
DC	System is waking from ACPI S3 state
E1-E8 EC-EE	OEM memory detection/configuration error. This range is reserved for chipset vendors & system manufacturers. The error associated with this value may be different from one platform to the next.

Bootblock Recovery Code Checkpoints

Checkpoint	Description
E0	Initialize the floppy controller in the super I/O. Some interrupt vectors are initialized. DMA controller is initialized. 8259 interrupt controller is initialized. L1 cache is enabled.
E9 EA	Set up floppy controller and data. Attempt to read from floppy. Enable ATAPI hardware. Attempt to read from ARMD and ATAPI CDROM.
EB	Disable ATAPI hardware. Jump back to checkpoint E9.
EF	Read error occurred on media. Jump back to checkpoint EB.
F0	Search for pre-defined recovery file name in root directory.
F1	Recovery file not found.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by the recovery file.
F3	Start reading the recovery file cluster by cluster.
F5	Disable L1 cache.
FA	Check the validity of the recovery file configuration to the current configuration of the flash part.
FB	Make flash write enabled through chipset and OEM specific method. Detect proper flash part. Verify that the found flash part size equals the recovery file size.
F4	The recovery file size does not equal the found flash part size.
FC	Erase the flash part.
FD	Program the flash part.
FF	The flash has been updated successfully. Make flash write disabled. Disable ATAPI hardware. Restore CPUID value back into register. Give control to F000 ROM at F000:FFF0h.

POST Code Checkpoints

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
07	Fixes CPU POST interface calling pointer.
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
C0	Early CPU Init Start -- Disable Cache – Init Local APIC
C1	Set up boot strap processor Information
C2	Set up boot strap processor for POST
C5	Enumerate and set up application processors
C6	Re-enable cache for boot strap processor
C7	Early CPU Init Exit
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
20	Relocate System Management Interrupt vector for all CPU in the system.
24	Uncompress and initialize any platform specific BIOS modules. GPNV is initialized at this checkpoint.

2A	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that has optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information. USB controllers are initialized at this point.
39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, … etc.) successfully installed in the system and update the BDA, EBDA…etc.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory. Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75 78	Initialize Int-13 and prepare for IPL detection. Initializes IPL devices controlled by BIOS and option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84 85	Log errors encountered during POST. Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested. Check boot password if installed.
8C	Late POST initialization of chipset registers.
8D 8E	Build ACPI tables (if ACPI is supported) Program the peripheral parameters. Enable/Disable NMI as selected

90	Initialization of system management interrupts by invoking all handlers. *Please note this checkpoint comes right after checkpoint 20h*
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module. Display boot option popup menu.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector.
AB	Prepare BBS for Int 19 boot. Init MP tables.
AC	End of POST initialization of chipset registers. De-initializes the ADM module.
B1	Save system context for ACPI. Prepare CPU for OS boot including final MTRR values.
00	Passes control to OS Loader (typically INT19h).

Beep Codes

Boot Block Beep Codes

Number of Beeps	Description
1	Insert diskette in floppy drive A:
2	'AMIBOOT.ROM' file not found in root directory of diskette in A:
3	Base Memory error
4	Flash Programming successful
5	Floppy read error
6	Keyboard controller BAT command failed
7	No Flash EPROM detected
8	Floppy controller failure
9	Boot Block BIOS checksum error
10	Flash Erase error
11	Flash Program error
12	'AMIBOOT.ROM' file size error
13	BIOS ROM image mismatch (file layout does not match image present in flash device)

POST BIOS Beep Codes

Number of Beeps	Description
1	Memory refresh timer error.
2	Parity error in base memory (first 64KB block)
3	Base memory read/write test error
4	Motherboard timer not operational
5	Processor error
6	8042 Gate A20 test error (cannot switch to protected mode)
7	General exception error (processor exception interrupt error)
8	Display memory error (system video adapter)
9	AMIBIOS ROM checksum error
10	CMOS shutdown register read/write error
11	Cache memory test failed

Troubleshooting POST BIOS Beep Codes

Number of Beeps	Troubleshooting Action
1, 2 or 3	Reseat the memory, or replace with known good modules.
4-7, 9-11	Fatal error indicating a serious problem with the system. Consult your system manufacturer. Before declaring the motherboard beyond all hope, eliminate the possibility of interference by a malfunctioning add-in card. Remove all expansion cards except the video adapter. · If beep codes are generated when all other expansion cards are absent, consult your system manufacturer's technical support. · If beep codes are not generated when all other expansion cards are absent, one of the add-in cards is causing the malfunction. Insert the cards back into the system one at a time until the problem happens again. This will reveal the malfunctioning card.
8	If the system video adapter is an add-in card, replace or reseat the video adapter. If the video adapter is an integrated part of the system board, the board may be faulty.

Resource List

ICH7 GPI/O Definition

GPIO	Alt Func	Pin	I/O/NC	Power	PU	SMI	Tol	Default	Rickies Signal Name
GPIO[0]	BM_BUSY#	AB18	I	VCC3p3	N	Y	3.3	N/A	BM_BUSY#
GPIO[1]	PCIREQ[5]#	C8	I	V5REF	Y	N	5	N/A	PIRQ#5
GPIO[2]	PIRQE#	G8	I	V5REF	Y	N	5	N/A	PIRQ#E
GPIO[3]	PIRQF#	F7	I	V5REF	Y	N	5	N/A	PIRQ#F
GPIO[4]	PIRQG#	F8	I	V5REF	Y	N	5	N/A	PIRQ#G
GPIO[5]	PIRQH#	G7	I	V5REF	Y	N	5	N/A	PIRQ#H
GPIO[6]	unmuxed	AC21	I	Vcc3p3	Y	Y	3.3	N/A	SIO_OVT#
GPIO[7]	BIOS_WP#	AC18	I	Vcc3p3	Y	N	3.3	N/A	BIOS_WP#
GPIO[8]	unmuxed	B21	I	Vccsus3p3	Y	Y	3.3	N/A	VCC3_SB
GPIO[9]	unmuxed	B20	I	Vccsus3p3	Y	N	3.3	N/A	LAN1_EN
GPIO[10]	unmuxed	A20	I	Vccsus3p3	Y	N	3.3	N/A	LAN2_EN
GPIO[11]	SMBALERT#	B23	I	Vccsus3p3	Y	Y	3.3	N/A	SMB_ALERT#
GPIO[12]	unmuxed	E19	I	Vccsus3p3	Y	N	3.3	N/A	LAN3_EN
GPIO[13]	unmuxed	E19	I	Vccsus3p3	Y	Y	3.3	N/A	SIO_PME#
GPIO[14]	NC	R4	I	Vccsus3p3	Y	Y	3.3		NC
GPIO[15]	NC	B22	I	Vccsus3p3	N	N	3.3	1	ATXPWR_SELECT
GPIO[16]	DPRSLPVR	AC22	O	Vcc3p3	N	N	3.3	1	DPRSLPVR
GPIO[17]	PCIGNT[5]#	D8	O	Vcc3p3	N	N	3.3	1	NC
GPIO[18]	STPPCI#	AC20	O	Vcc3p3	N	N	3.3	1	NC
GPIO[19]	AMP_GAIN0	AH18	I	Vcc3p3	D	N	3.3	1	AMP_GAIN0
GPIO[20]	STPCPU#	AF21	O	Vcc3p3	N	N	3.3	0	NC
GPIO[21]	AMP_EN	AF19	I	Vcc3p3	N	N	3.3	0	AMP_EN
GPIO[22]	RDQ4#	A13	I	Vcc3p3	N	N	3.3	0	RDQ4#
GPIO[23]	UDRQ1#	AA3	O	Vccsus3p3	N	N	3.3		NC
GPIO[24]	NC	B3	O	Vccsus3p3	Y	N	3.3	1	NC
GPIO[25]	NC	D20	O	Vccsus3p3	N	N	3.3	N/A	NC
GPIO[26]	EL_RSVD	A21	O	Vccsus3p3	N	N	3.3	0	NC
GPIO[27]	EL_SWAVO	B21	O	Vccsus3p3	N	N	3.3	0	NC
GPIO[28]	CC#5_ATI	C23	O	Vccsus3p3	N	N	3.3	0	NC
GPIO[29]	CC#6	A2	I	Vccsus3p3	Y	N	3.3		VCC3_SB
GPIO[30]	CC#6	A2	I	Vccsus3p3	Y	N	3.3		VCC3_SB
GPIO[31]	CC#7	B2	I	Vccsus3p3	Y	N	3.3		VCC3_SB
GPIO[32]	CLKRUN#	AG18	O	Vcc3p3	N	N	3.3	1	NC
GPIO[33]	AZ_DOCK_EN#	AC19	O	Vcc3p3	N	N	3.3	1	AUXGPIO_DIR1
GPIO[34]	AZ_DOCK_RST#	U2	O	Vcc3p3	N	N	3.3	1	AUXGPIO_DIR2
GPIO[35]	SATACLKREQ0#	AD21	O	Vcc3p3	N	N	3.3	0	NC
GPIO[36]	AMP_GAIN1	AH19	I	Vcc3p3	N	N	3.3	0	AMP_GAIN1
GPIO[37]	NC	AE19	I	Vcc3p3	N	N	3.3	0	NC
GPIO[38]	unmuxed	AD20	I	Vcc3p3	Y	N	3.3	1	AUXGPIO_OB#
GPIO[39]	unmuxed	AE20	I	Vcc3p3	Y	N	3.3	1	NC
GPIO[48]	GNT4#	A14	O	Vcc3p3	N	N	3.3	1	NC
GPIO[49]	H_PWRGD	AG24	OD	V_FSB_VTT	Y	N	3.3	1	H_PWRGD

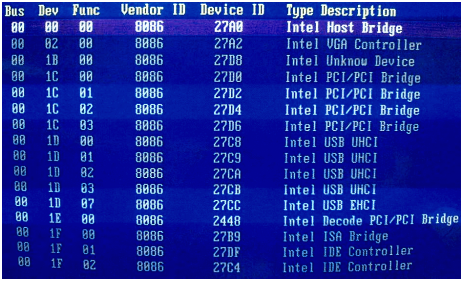
Winbond W83627EHG SIO GPI/O Definition

GPIO	Pin	Typ	Power	Connection
GPIO10	128	IO	VCC	AUXGPIO10
GPIO11	127	IO	VCC	AUXGPIO11
GPIO12	126	IO	VCC	AUXGPIO12
GPIO13	125	O	VCC	AUXGPIO13
GPIO14	124	O	VCC	AUXGPIO14
GPIO15	123	IO	VCC	AUXGPIO15
GPIO16	122	IO	VCC	AUXGPIO16
GPIO17	121	IO	VCC	AUXGPIO17
GPIO20	120	O	VCC	AUXFAN_PWM
GPIO21	119	I	VCC	AUX_FAN
GPIO22	19	IO	VCC	NC
GPIO23	2	IO	VCC	NC
GPIO24	66	IO	VSB	NC
GPIO25	65	IO	VSB	NC
GPIO26	63	IO	VSB	NC
GPIO27	62	IO	VSB	NC
GPIO30	92	IO	VSB	AUXGPIO20
GPIO31	91	IO	VSB	AUXGPIO21
GPIO32	90	I	VSB	AUXGPIO22
GPIO33	89	IO	VSB	AUXGPIO23
GPIO34	88	IO	VSB	AUXGPIO24
GPIO35	87	IO	VSB	AUXGPIO25
GPIO36	69	IO	VSB	AUXGPIO26
GPIO37	64	IO	VSB	AUXGPIO27
GPIO40	85	IO	VSB	NC
GPIO41	84	IO	VSB	NC
GPIO42	83	IO	VSB	NC
GPIO43	82	IO	VSB	NC
GPIO44	81	IO	VSB	RS422_EN1
GPIO45	80	IO	VSB	RS422_EN2
GPIO46	79	IO	VSB	RS485_EN1
GPIO47	68	IO	VSB	RS485_EN2
GPIO50	77	IO	VSB	NC
GPIO51	75	IO	VSB	NC
GPIO52	73	I	VSB	SLP_S3#
GPIO53	72	O	VSB	PS_ON#
GPIO54	71	IO	VSB	NC
GPIO55	70	IO	VSB	NC
GPIO56	68	I	VSB	PWRBTIN
GPIO57	67	O	VSB	PWRBTN#
GPIO60	57	IO	VCC	NC
GPIO61	56	IO	VCC	NC
GPIO62	54	IO	VCC	NC
GPIO63	53	IO	VCC	NC
GPIO64	52	IO	VCC	NC
GPIO65	51	IO	VCC	NC
GPIO66	50	IO	VCC	NC
GPIO67	49	IO	VCC	NC

I/O Map

I/O Port	Description
0000-000F	DMA Controller 1
0020-0021	Interrupt Controller 1
0040-0043	System Timer
004E-004F	SIO Port
0060, 0064	Keyboard Controller
0070-0073	RTC and CMOS
0080-0090	DMA Controller Page Registers
0092	Port 92h
00A0-00A1	Interrupt Controller 2
00B2-00B3	APM register
00C0-00DF	DMA Controller 2
00F0-00FF	Numeric Data Processor
01F0-01F7	Primary IDE Controller
02F8-02FF	COM2
0376	Secondary IDE Controller
0378-037F	LPT1
03F6	Primary IDE Controller
03F8-03FF	COM1
0400-045F	ACPI I/O space
0500-050F	SMBus I/O Space
0CF8-0CFF	PCI configuration Port

PCI Devices



Bus	Dev	Func	Vendor ID	Device ID	Type Description
00	00	00	8086	27A0	Intel Host Bridge
00	02	00	8086	27A2	Intel VGA Controller
00	1B	00	8086	27D8	Intel Unknow Device
00	1C	00	8086	27D0	Intel PCI/PCI Bridge
00	1C	01	8086	27D2	Intel PCI/PCI Bridge
00	1C	02	8086	27D4	Intel PCI/PCI Bridge
00	1C	03	8086	27D6	Intel PCI/PCI Bridge
00	1D	00	8086	27C8	Intel USB UHCI
00	1D	01	8086	27C9	Intel USB UHCI
00	1D	02	8086	27CA	Intel USB UHCI
00	1D	03	8086	27CB	Intel USB UHCI
00	1D	07	8086	27CC	Intel USB EHCI
00	1E	00	8086	2448	Intel Decode PCI/PCI Bridge
00	1F	00	8086	27B9	Intel ISA Bridge
00	1F	01	8086	27DF	Intel IDE Controller
00	1F	02	8086	27C4	Intel IDE Controller

SMBus Resource Allocation

SMBus Resource Allocation		
Device	Address	Description
MS-7	0101 111X	MSI ACPI Controller
DIMM Slot	1010 0000	SPD

ISA Interrupt Allocation

IRQ	Description
IRQ0	System Timer
IRQ1	Keyboard Controller
IRQ2	Second 8259A
IRQ3	COM2 / COM4
IRQ4	COM1 / COM3
IRQ5	LPT2
IRQ6	Floppy Disk Drive
IRQ7	LPT1
IRQ8	RTC
IRQ9	Redirected IRQ2
IRQ10	Reserved
IRQ11	Reserved
IRQ12	Reserved
IRQ13	Math Coprocessor
IRQ14	Fixed Disk
IRQ15	Reserved

ISA DMA Channel Allocation

DMA Channel	Description
Channel 0	Unassigned 8-bit channel
Channel 1	Unassigned 8-bit channel
Channel 2	Unassigned 8-bit channel
Channel 3	Unassigned 8-bit channel
Channel 4	Cascade channel
Channel 5	Unassigned 16-bit channel
Channel 6	Unassigned 16-bit channel
Channel 7	Unassigned 16-bit channel